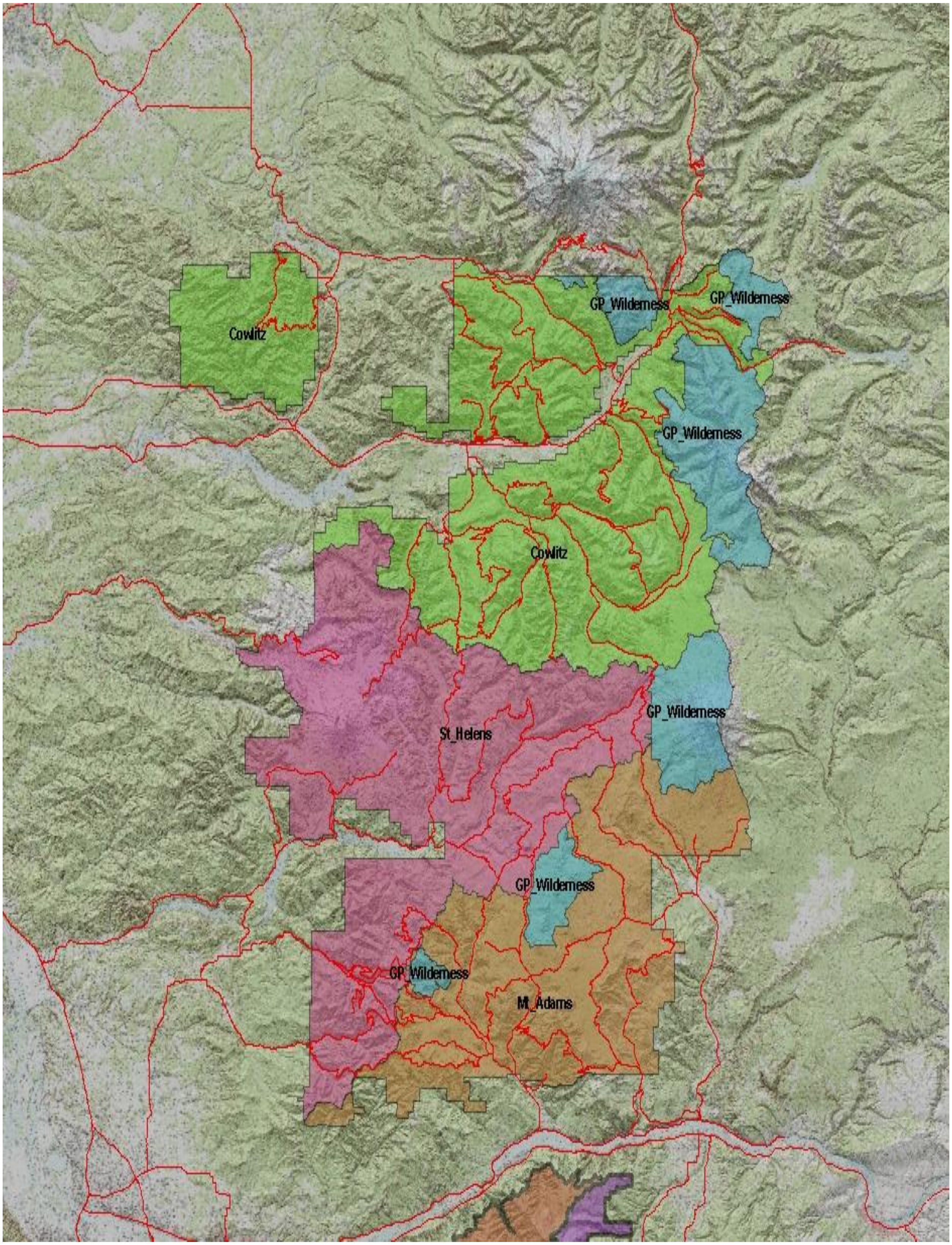
3.2 – A. Fire Management Considerations for Specific Fire Management Units

3.2.1 Cowlitz Valley FMU Snap Shot

- **FMU Name:** Cowlitz Valley
- **Fire Behavior Indicator:** Energy Release Component (ERC)
- **NFDRS Weather Station:** HAGAR RAWS – NWSID 451115 and ORRCR RAWS – NWSID 451919
- **Acres/Agency:** 550,800 acres
- **Predominant Vegetation Types:** National Fire Danger Rating System fuel model G represents the fuel conditions within this FMU. The primary fuel model is represented by dense stands of mature Douglas-fir with heavy accumulations of ground litter and large woody materials.
- **IA Dispatch Office:** Columbia Cascade Communication Center
- **LRMP options available for management response:** Fire suppression strategies depend upon specific Management Area standards and guidelines, alternative suppression strategies to consider include confine, contain and control. Section 3.1.1. Gifford Pinchot Land and Resource Management Plan *and FMU* Guidance, Table 1.3. Management Response Strategies for LRMP Designated and Management Areas, of this document, summarizes management response suppression strategies for specific Management Areas.

Figure 1.2 Cowlitz Valley FMU



3.2.2 FMU Guidance

- **Desired Conditions, Objectives, Guidelines, Goals and Standards:** Section 3.1.1. Gifford Pinchot Land and Resource Management Plan *and FMU* Guidance, Table 1.3. Management Response Strategies for LRMP Designated and Management Areas provides a summary of guidance for this FMU.

3.2.3 FMU Characteristics

3.2.3.1 Safety

Firefighter and public safety is the primary concern. Limited accessibility, steep terrain, and areas of heavy timber can challenge the efficacy and safety of suppression efforts. Where these concerns arise, suppression tactics that minimize threats to firefighter and safety will be employed.

- Fire fighter and public safety will remain the utmost priority. Terrain, accessibility, and potential fire behavior will influence fire management decisions.
- Accessibility: Unroaded land allocations or poor road conditions may limit accessibility. Ingress and egress will be clearly marked and addressed in pre-engagement safety briefings.
- Lava beds: travel and navigation may be difficult over lava flows.
- Aviation hazards: a map of known aviation hazards on the forest is available.
- Driving: Roads are often primitive and shared by other forest users. Defensive driving is required at all times. Caution should also be taken for wildlife and in areas of poor visibility due to sun/shade and blind turns. Traffic laws are to be obeyed at all times, including en route to an incident.
- Wildfires that have the potential to affect the wildland urban interface will follow a control strategy. Firefighting personnel will be educated in additional threats associated with fires in the wildland urban interface.
- Public use: Prevention efforts will focus on high public use areas. In the event of an incident, care will be taken to inform and evacuate the public where necessary to ensure their safety.
- Smoke: Communities most likely to be affected by smoke from fires in the Cowlitz Valley FMU are Randle, Packwood, High Valley and Morton. Larger fires occurring under East Wind conditions may affect the Chehalis area as well as the I-5 corridor. Smoke may also affect developed and undeveloped recreation areas. Smoke impacts will be considered during daily incident evaluations.
- Weather: Mountain weather is unpredictable. Thunderstorms and instability in the atmosphere contribute to fire ignition as well as fire spread. A common thunderstorm track along the Cascades passes over the Cowlitz Valley FMU, often bringing lighting in June and July.

3.2.3.2 Physical Characteristics

- The Cowlitz Valley FMU encompasses the entire ranger district on the northern half of the forest. Major watersheds include the upper Cowlitz, Nisqually, Puyallup and Chehalis river drainages. Elevations range from 1000 feet in the river bottoms to over 6000 feet or timberline on the major peaks.

3.2.3.3 Biological

- Wildlife habitat: Where habitat exists, northern spotted owls may inhabit the Cowlitz Valley FMU as well as barred owls, pileated woodpeckers, goshawks, and bald eagles. Other wildlife include blacktail deer, Roosevelt elk, and black bear, cougar, bobcat, and pine marten.
- Rivers and streams provided habitat to sensitive species of fish.
- Rare, culturally important, and special forest product botanical resources are found in the FMU.

3.2.3.4 Resources

- Timber: The timber management program provides wood products and positive economic returns. Suppression strategies will minimize the damage to the timber resource on both National Forest and adjacent lands.
- Late Successional Reserves: The late successional reserves are designated based on their potential to provide habitat for the northern spotted owl. Suppression strategies will aim to minimize alteration to that desired habitat designation.
- Recreation: The Cowlitz Valley FMU provides developed and undeveloped campsites, as well as opportunities for hunting, fishing, hiking and backpacking. Fires may inconvenience recreational users either by displacement or visual impacts.
- Cultural resources: Resource specialists will determine potential effects of activities on cultural resources including Native American spiritual sites and natural resources. To the extent possible, undesirable fire effects will be mitigated. Historic structures including Gotchen Guard Station, Peterson Prairie Guard Station, and Red Mountain Lookout will be protected.
- Botanicals: The special forest products programs allows the gathering of boughs, beargrass, huckleberries, mushrooms, Christmas trees, firewood, and other botanicals. Threatened and endangered botanical species will be handled in the same way as wildlife. The adaptability or susceptibility of a particular species to fire will be specifically considered along with potential fire intensity and extent.
- Soil: Potential effects of fire to soil include the combustion of surface litter and duff layers, changes in color and chemical composition through the release of carbon, nitrogen and phosphorous in the consumption of live and dead biomass, hydrophobicity, erosion, and debris slides. Low and moderate intensity fires are unlikely to result in effects that significantly influence ecosystem composition and productivity. High severity fires increase the probability for erosion and landslide, but the predominant fire regime over most of the area is one that primarily experiences high severity fire, making these disturbance events within the natural range of variability.

- Wildlife: Northern spotted owls, barred owls, pileated woodpeckers, goshawks, and bald eagles, blacktail deer, Roosevelt elk, and black bear, cougar, bobcat, and pine marten, and many other wildlife species are found in the Cowlitz Valley FMU. Direct and indirect effects of fire to wildlife vary by species and the timing and intensity of the burn. They can include reduction or loss of habitat, harassment, displacement, or death from fire, smoke, and disturbance from suppression activities. The potential for sedimentation and loss of fish habitat will be address for all fires occurring near major waterways, particularly where the fuel loadings are outside of their natural range of variability.

3.2.4 FMU Fire Environment

Historical fire maps indicate several large fires in the Cowlitz Valley FMU during the mid- to late- 1800s and early-1900s including portions of the Yacolt, Dole Valley, Lewis River, and Willard Fires. A combination of ignition sources contributes to the variability in historical fire regimes in the area. Lightning caused fires were common, but anthropological evidence suggests that local fire regimes were highly influenced by Native Americans and sheep herders who set fires in early fall to improve the production of huckleberries and forage. Railroad companies and escaped silvicultural burns add to the number of human-caused fires. Uncontrolled fires before the era of fire suppression occurred in various landscapes, fuel loading, stages of succession, and under different weather and topographic conditions.

The introduction of fire suppression and federal protection of lands greatly decreased the size and frequency of fires. Recently, most fires occur in summer months, are lightning caused, and are low intensity with some passive crowning. Fire suppression efforts and precipitation that often accompanies summer thunderstorms have kept fires relatively small. Climatic variations dictate the average frequency of lightning storms and ignitions by influencing the potential for storms and fuel flammability. When an ignition occurs, topography, wind, fuel type, and fuel loading play an important role in the impacts of fire on the landscape.

During a typical fire season, fuels dry progressively throughout the season. Fine fuels dry in July and August while coarse fuels reach their maximum dryness in September. These fuel conditions lead to the maximum number of fires occuring in July and August but most large fires occurring in September. Historically, most large fires were human caused, east wind influenced, and in September.

Fuel Models

The 13 standard fire behavior fuel models (FBFMs) were developed to serve as inputs to Rothermel's mathematical surface fire behavior and spread model (Rothermel 1972). They represent distinct distributions of fuel loading found among surface fuel components (live and dead), size classes, and fuel types. The FBFMs are separated into grass, brush, timber litter, or slash groups and then broken down further by loading by size class, fuelbed depth, and moisture of extinction.

A relatively large portion of the Cowlitz Valley FMU is classified as FBFM 10 according to LANDFIRE data. FBFM 10 has the heaviest fuel loading of the timber litter group. Most of the highly productive Douglas-fir- western hemlock forests of the Cowlitz Valley

FMU are FBFM 10. Some of the Pacific silver fir and grand fir forests may fall into this category as well. Anderson (1982) describes it as follows:

> The fires burn in the surface and ground fuels with greater fire intensity than the other timber litter models. Dead-down fuels include greater quantities of 3-inch or larger limbwood resulting from overmaturity or natural events that create a large load of dead material on the forest floor. Crowning out, spotting, and torching of individual trees are more frequent in the fuel situation, leading to potential fire control difficulties (i.e., examples insect- or disease-ridden stands, wind-thrown stands, overmature situations with deadfall, and aged light thinning or partial-cut slash).

FBFM 8 is the next most common type, occurring at high elevations, less productive sites, thinned and treated stands, and in some areas on the Cowlitz Valley FMU. It is described here:

> Slow-burning surface fires with low flame lengths are generally the case, although the fire may encounter an occasional “jackpot” or heavy fuel concentration that can flare up. Only under severe weather conditions involving high temperatures, low humidities, and high winds do the fuels pose fire hazards. Closed canopy stands of short-needle conifers or hardwoods that have leafed out support fire in the compact litter layer. (Anderson 1982)

FBFM 9 is found along some of the riparian areas. It is characterized by long-needle conifers and hardwoods. Overall, fuels dry out slower than FBFM 8 and 10. Fires run through the surface litter faster than FBFM 8 and have longer flame height but with less intensity than FBFM 10 (Anderson 1982).

Less than 5% of the land is grassy meadows (FBFM 1) and shrub-dominated lands (FBFM 5). The grass models have potential for high rates of spread but that fire behavior is extremely unlikely with the amount of annual moisture received in the study areas. These meadows typically stay green and are considered fuel breaks. In FBFM 5, areas where fires are carried by shrubs and other surface fuels, “The fires are generally not very intense because surface fuel loads are light, the shrubs are young with little dead material, and the foliage contains little volatile material” (Anderson 1982).

Fire Regimes

Fire regimes are broken down based on the historical role of fire across a certain landscape without the influence of modern human intervention but including the influence of aboriginal fire use (Agee 1993; Brown 1995). The LANDFIRE models for biophysical settings used in this analysis classify fire regimes into five groups based on average fire frequency and severity indicated by percent overstory replacement. The following fire regime definitions use 25 and 75 percent as severity thresholds between low, mixed, and replacement regimes (FRCC Guidebook Version 1.3.0).

Group	Frequency	Severity	Severity Description
I	0-35 years	Low/mixed	Generally low-severity fires replacing less than 25% of the dominant overstory vegetation; can include mixed-severity fires that replace up to 75% of the overstory
II	0-35 years	Replacement	High-severity fires replacing greater than 75% of the dominant overstory vegetation
III	35-200 years	Mixed/low	Generally mixed-severity; can also include low-

			severity fires
IV	35-200 years	Replacement	High-severity fires
V	200+ years	Replacement/ any severity	Generally replacement-severity; can include any severity type in this frequency range

The majority of the Cowlitz Valley FMU falls within fire regime groups III and V. Lands in the western section of the FMU are fire regime group V with average fire return intervals greater than 200 years.

3.2.4.1 Fire Behavior

While major severe fires are infrequent, serious losses, primarily to the timber resource, wildlife habitat, recreation values and aesthetics, are long term in effect. Under high and extreme fire conditions expected fire behavior includes high intensity, frequent flare-ups, rapid spread and running crown fires. Control is difficult. Mop-up may be expensive. Fire management efforts should minimize acreage burned in recognition of the values at risk. During the NFMAS analysis of FY2000, this FMU had an average workload of 10.1 fires per year.

Most fires that occur are caused by lightning storms. Timber and surface fuels are dry enough to burn in early July although intensity is low and they are easily suppressed.

Large fires are possible in the steep inaccessible areas by late July to early August. Fires spread predictably up canyon – up slope during the day. Nighttime winds will spread fires down canyon in the lower half of the slope, sometimes with considerable acreage increases. These down canyon runs position the fire below upslope fuels setting up conditions for hard upslope runs the next burning period. In the higher elevations, fires that occur in August have the potential to burn at varying intensity levels through the remainder of the fire season. Afternoon relative humidity's can be low (teens to 20's) with gusty erratic winds. Fire spread is influenced by moderate range spotting due to the winds and low humidity's through non-continuous fuels.

Lightning activity generally occurs in July and August, with thunder cells developing along the crest of the Cascades moving from the S, SW to the N or NE. Most of the thunderstorms that occur on the west side of the crest have associated heavy rainfall; this is not always the case however and is rare on the east side of the Cascades. These storms don't necessarily cover the same area every day, but can occur somewhere on the forest for three to five days at a time. The rainfall suppresses some fires, but others can smolder undetected for several weeks following the storms. As in all parts of the forest, the most significant weather event, which has triggered large fire growth, is the presence of East winds on the western slopes of the Cascades. These winds reduce the relative humidity to the low teens or single digit numbers. Associated high winds, dry fuels and steep forested areas create large fire growth conditions. Conversely large fire growth on the east side of the Cascade crest is associated with strong westerly winds. These winds are created by frontal passages coming from the west or by strong down drafts from thunderstorm activity. Fire season begins to fade around the first of October. Daytime temperatures become cooler and nighttime temperatures are chilly.

The general fire season for the forest is roughly 100 days, beginning in July and ending in mid to late October. Due to the high elevation areas, the season is approximately a month later than the low elevation areas of the forest. This is dependent upon typical winter snowfall and spring snowmelt, which can change rapidly.

Fire exclusion has created stand structures in some places with ladder fuels that will contribute significantly to spotting and crowning potential.

3.2.4.2 Weather

Fuel moistures peak in late May to early June which is dependent upon the ending of the seasonal rains. As the Pacific storm track (jet stream) into western Washington becomes less frequent, precipitation in the Cowlitz Valley FMU begins to diminish. This, combined with longer daylight hours starts the drying trend that leads to fire season. Mild, wet winters and hot dry summers typify the climate of the Cowlitz Valley FMU. Average annual precipitation exceeds 140 inches, much of this occurring in the form of snow. Fine fuels reach their maximum dryness in July and August, while the larger fuels do not usually dry out until September. As a result, the highest number of fires in any given year occurs during July and August (roughly 65%), but most of these are less than ten acres in size. Most of the large fires and virtually all of the severe fires occur during September or from late August to early October. Consequently, the average peak for fire frequency occurs prior to the average peak for fire size.

One of the most critical factors affecting fire size is the Foehn wind known as the East Winds, caused by pressure gradients across the Cascades. East winds can occur at any time of the year on all parts of the forest, but they are most frequent in the fall. Another factor most recently experienced in the 2008 early July Coldsprings Fire, when periods of critically dry and unstable air mass development over the Cascade range, along with a Haines index of six created an explosive fire event which burned nearly eight thousand acres of forest lands. Prior to the Coldsprings fire, the largest and most severe fires on the GPNF have all been associated with east winds (Yacolt, Siouxon, Lewis River, Cispus, Dole, Willard, Ruth). All of these large fires with the exception of Cispus were on the south half of the forest where the east winds are most severe. All of the large fires were also preceded by several weeks of extremely hot and dry weather and all but the Willard fire occurred during the month of September.

The primary ignition source on the forest continues to be from lightning. Human caused fires continue to increase however as more areas adjacent to the forest are being developed and as visitor use patterns change. Although lightning is less common on the west side of the Cascades than the east side, it still accounts for a large percent of the fire starts (ranging from 35-70%). During the summer season, cells develop and move north along the Cascade Range. These cells are often associated with rain showers as well as dry lightning. The Pacific high dominates summertime weather causing hot temperatures (75-90+ degrees), dry humidities (30-40%, frequently lower), and low 10-hour fuel moistures (3-5%). Summer rainfall is non-existent except for precipitation from passing thunderstorms, which mainly falls at higher elevations. Fall rains generally return in mid to late October.

The ending of fire season is more variable than the start. Although dwindling sunlight provides less ground heating, season ending moisture is dependant on Pacific storm systems. The location of the jet stream plays a major role in determining the path of the storms. Historically the fire season has ended in October.